



# WEATHER OF THE GROWING SEASON IN THE CLAY BELT

of Western Quebec and Northern Ontario

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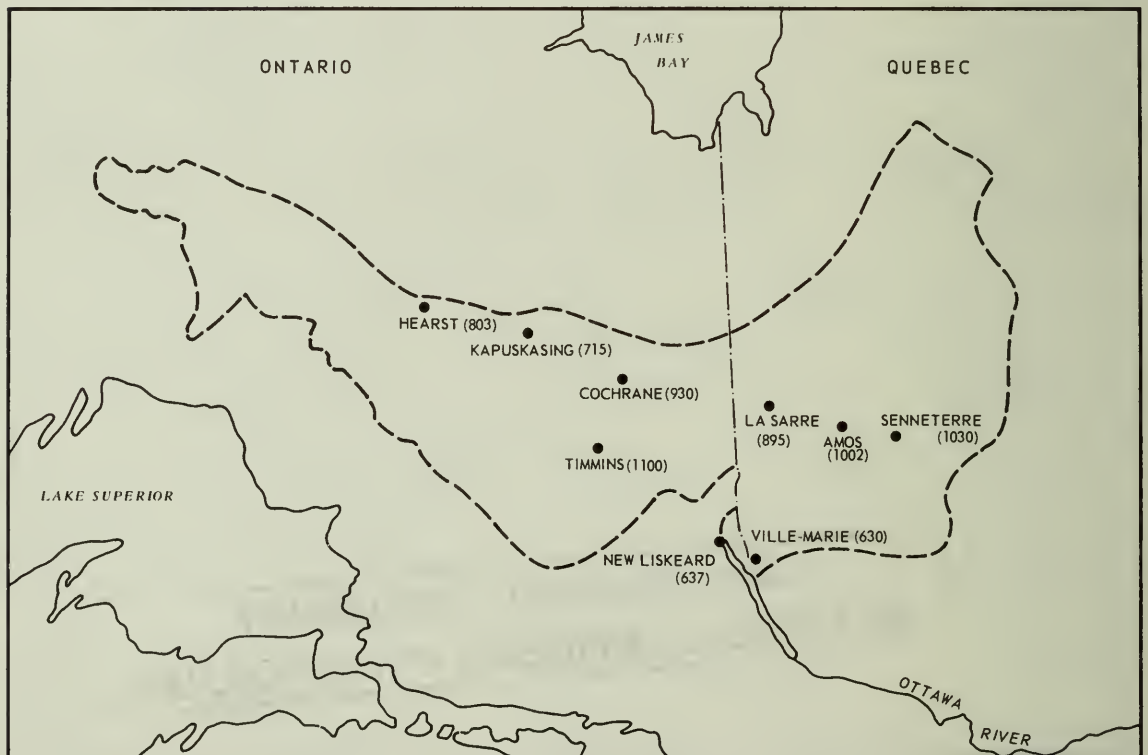
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## FORAGE CROPS FAVORED

The growing season in the Clay Belt averages from May 20 to September 20. Rainfall is abundant and well distributed. On moderately well drained land, seeding and other spring farm work are favored by low rainfall. Where drainage is good, it is possible to gather hay and silage in good condition during July if the work is begun at the first of the month to take advantage of the high, drying temperatures. If haying is not begun at the first of July, it is likely to continue into August. Then there is risk of spoilage because of frequent rains.

To facilitate harvesting, it is best to grow cereals for grain, and also hay and silage crops, only on the best-drained fields.

Figure 1 - The Clay Belt (broken lines). The altitudes are given in parentheses.



# WEATHER OF THE GROWING SEASON IN THE CLAY BELT

of Western Quebec and Northern Ontario

P. DERMINE

Experimental Farm, Kapuskasing, Ontario

In the Clay Belt of western Quebec and northern Ontario (Figure 1) the climate limits greatly the choice of crops that may be grown profitably. Yet agriculture has developed rapidly, especially in Abitibi, western Quebec. In 1961 the number of farms in this area was nearly 3,440, with a total of more than 269,000 acres improved. In the same year, in the Cochrane district in northern Ontario there were 900 farms, with a total of about 81,000 acres improved. Further, in Temiskaming there were 1,070 farms (122,000 acres) in the Ontario part and 1,790 farms (155,000 acres) on the Quebec side. The arable land in the Belt totals 16 million acres in Ontario and 13 million in Quebec.

The Clay Belt is a slightly undulating plateau with an average altitude of 600 to 1,000 feet (Table 1). In depressions there are peat bogs in an early stage of decomposition and of varying depth. The bogs aggravate the difficulty of draining the heavy clay soil, and in some years some farm operations cannot be completed. Except Temiskaming, which drains into the Ottawa River, the area drains north into James Bay.

The Clay Belt is suitable for growing forage and pasture crops and oats and barley for feed grain. Corn for silage is also promising in Temiskaming. The cool weather and abundant and well-distributed rainfall during the summer (Table 1) favor the growth of forage plants but hinder

Table 1 - Main Weather Conditions at Three Stations in the Clay Belt  
Averages for 1950-61

Station	Latitude N	Longitude N	Altitude Feet	Day-degrees May to September		Rainfall, May to September		
				Above 40°	Above 50°	Total Inches	Days with at least 0.01 inch	0.1 inch
Kapuskasing	49° 25'	82° 23'	715	2455	1168	15.1	67	36
Amos	48° 34'	78° 08'	1002	2404	1103	16.6	66	42
Ville-Marie	47° 19'	79° 26'	630	2763	1382	16.8	51	36

haying. Further, grain is often difficult to harvest as the soil is nearly always wet toward the end of August and in September, because of lower temperatures and evaporation and slightly higher rainfall. Hence it is best to grow cereal crops for grain, and even hay and silage crops, only on the best-drained land.

This report is based on records taken from 1950 to 1961 at three stations: Kapuskasing, Amos, and Ville-Marie.

## TEMPERATURE

### Frost-free Season

With few exceptions, the three stations are free of frost (32° F) during July and August. The last killing frost (28° F) in spring comes about May 20 (Table 2) and the first in the fall about September 20.

For forage plants and cereal crops that are rather frost-hardy, the growing season lasts 120 to 130 days. For more sensitive crops, it averages only 85 to 95 days.

At Kapuskasing, on well-drained land, the seeding of cereal crops usually begins about May 13 and the grazing season for cattle lasts from June 4 to October 28. The season for field work averages about 160 days. At Kapuskasing no field work is possible after November 11, when the soil becomes frozen.

### Average Temperature

The average maximum temperatures (Figure 2) indicate the amount of heat that contributes to growth of plants. The average minimums may retard development and the effect increases as the minimums decrease.

Amos and Ville-Marie have almost the same maximum temperatures, several degrees higher than those at Kapuskasing. But Amos has cooler

Table 2 - Average Dates of the Last Frost in Spring and the First in the Fall, 1950-61

Station	Last in spring		First in fall		Frost-free period Days	
	28°	32°	32°	28°	32°	28°
Kapuskasing	May 20	June 3	Sept. 7	Sept. 17	96	120
Amos	May 21	June 11	Sept. 3	Sept. 22	84	125
Ville-Marie	May 19	June 9	Sept. 14	Sept. 27	97	131

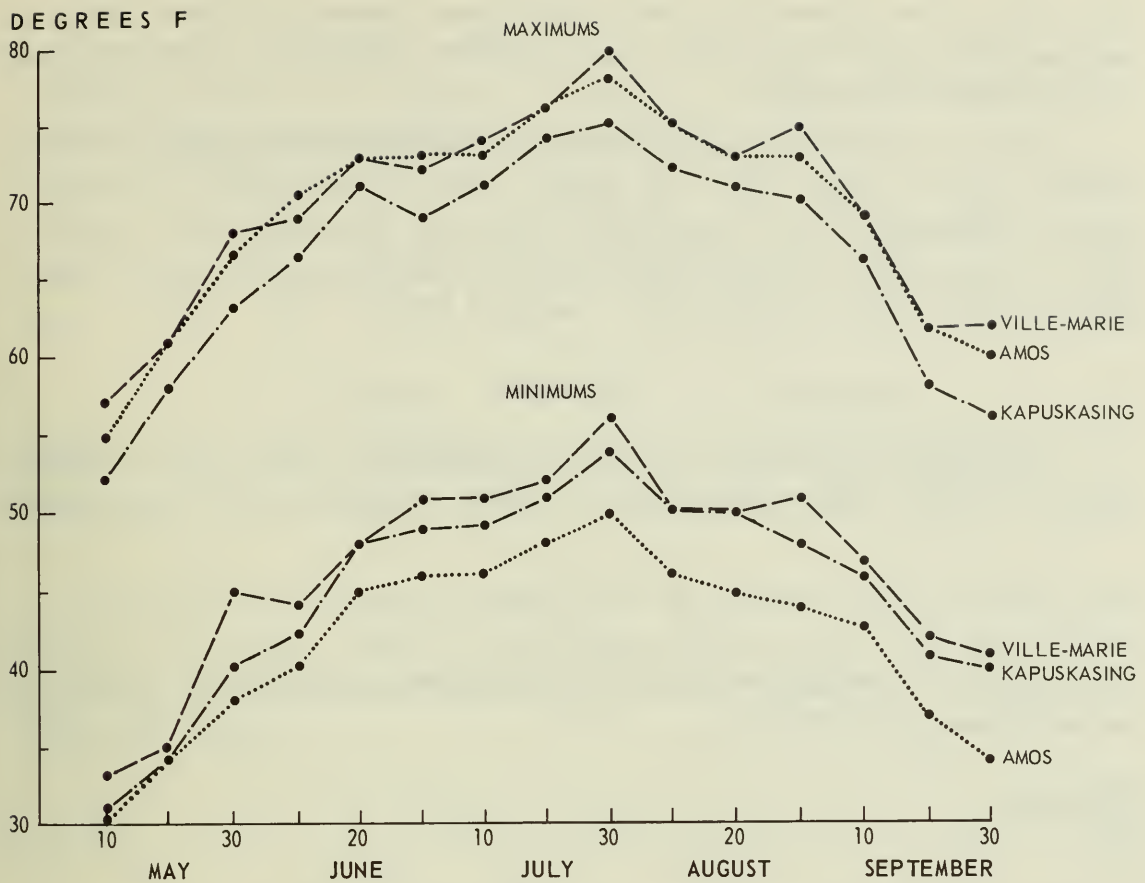


Figure 2 - Average maximum and minimum temperatures for 10-day periods during the growing season at three stations, 1950-61.

nights than Ville-Marie or Kapuskasing. In the Belt the night temperature drops as low as 35° F 14 to 19 times in May, three to six times in June, and once or twice in August. In September it drops as low as 35° an average of 14 nights at Amos, but only nine at Kapuskasing and seven at Ville-Marie.

### Day-degrees

As many field crops require a temperature of about 40° F to grow, and others such as corn 50°, the numbers of day-degrees above these thresholds are useful in comparing the temperatures of different districts. For example, if the average daily temperature is 62°, the number of day-degrees for that day is 22 if the threshold temperature is 40° and 12 if the threshold is 50°.

During the growing season, Amos and Kapuskasing have almost the same pattern of day-degrees above 40° and also above 50° (Figures 3 and 4).

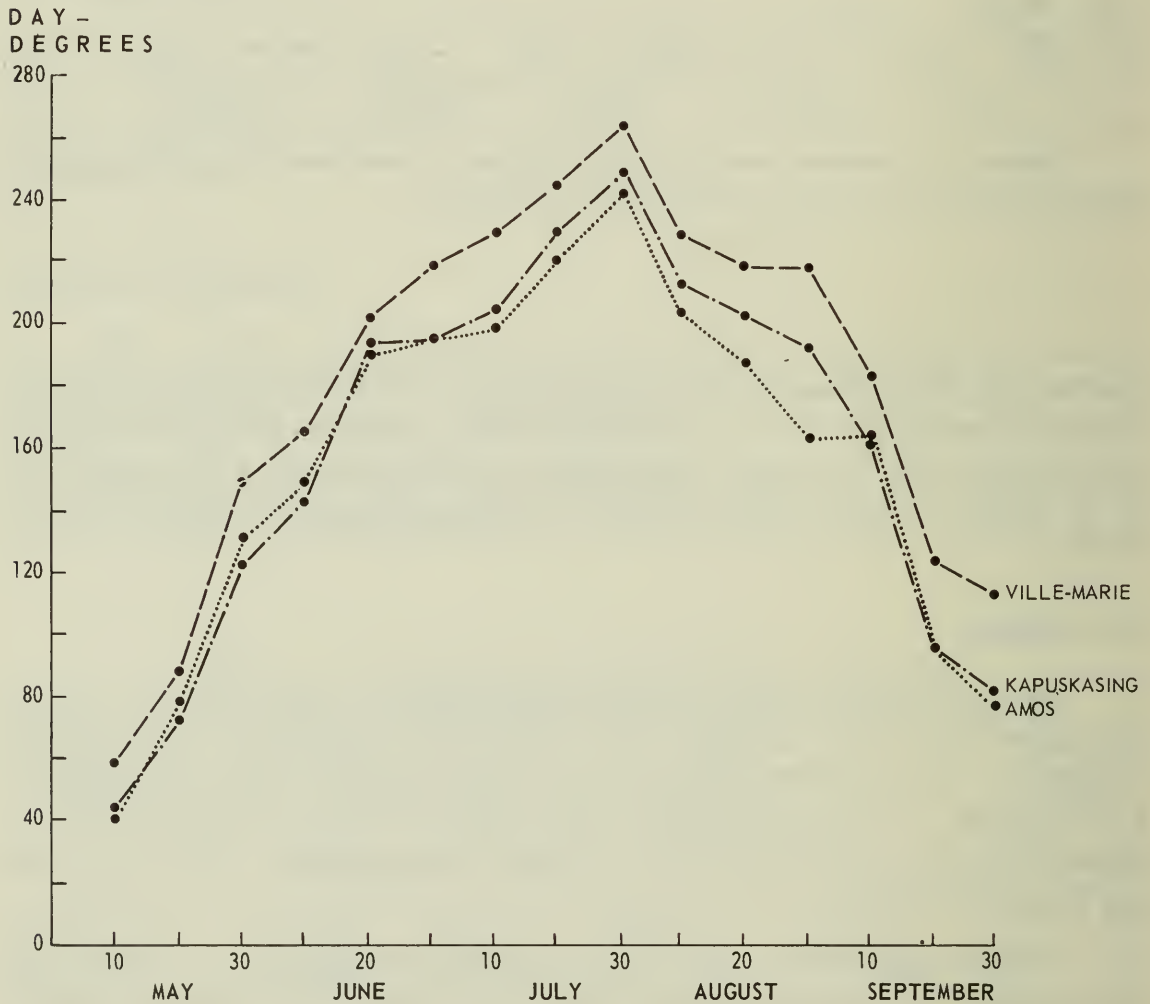
Ville-Marie has appreciably more day-degrees above 40° than Amos or Kapuskasing, especially after June 20. The advantage is greater still for day-degrees above 50°.

Of the total day-degrees above the threshold temperatures, 75 to 80 percent come in June, July and August. July is noticeably the warmest month, Kapuskasing and Amos having about 30 percent of their seasonal totals of day-degrees above the thresholds then. This explains why forage plants make most of their growth in June and July.

### SUNSHINE

The number of hours of sunshine is important in plant growth not only directly but also indirectly because it affects temperature and evaporation.

Figure 3 - Day-degrees above 40° F for 10-day periods during the growing season, averages for 1950-61.



At Kapuskasing the total number of hours of sunshine during 10-day periods ranges from 65 to 80 from early in May to August 20, and then decreases rapidly. The numbers of hours for 10-day periods during the growing season averaged as follows from 1919 to 1961:

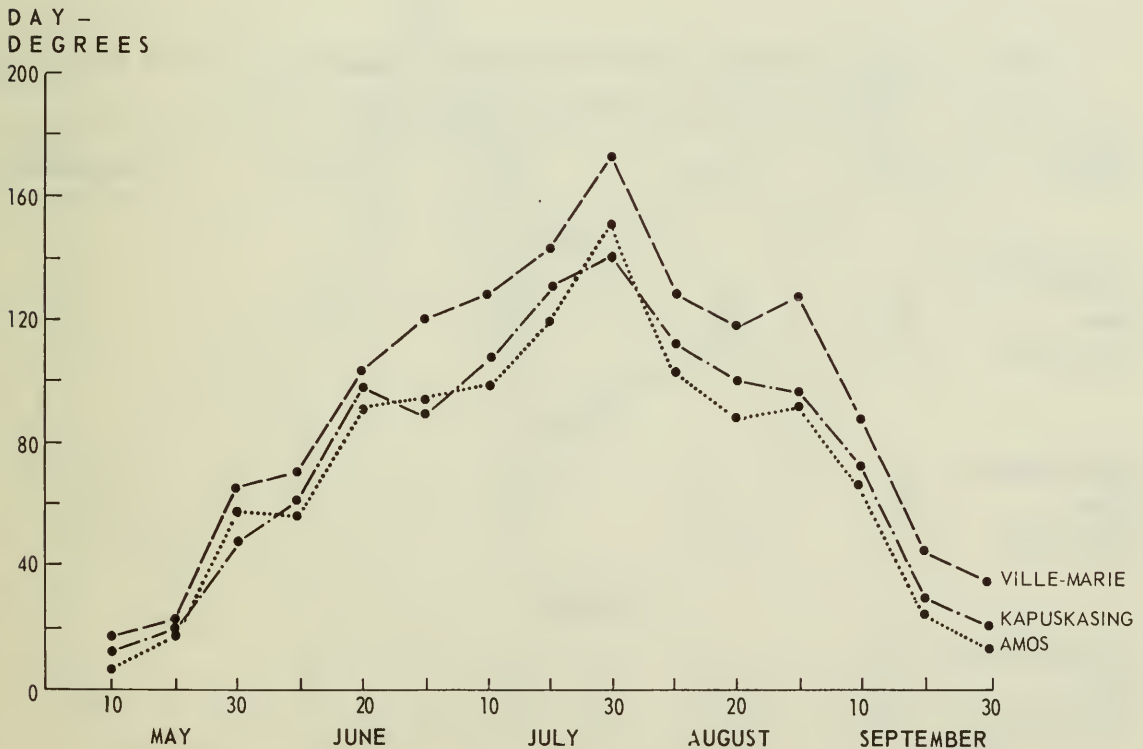
	May			June			July		
Period	1-10	11-20	21-30	1-10	11-20	21-30	1-10	11-20	21-30
Hours	58.0	69.4	65.6	68.3	74.8	69.0	77.6	78.5	71.6

	August			September		
Period	1-10	11-20	21-30	1-10	11-20	21-30
Hours	71.1	66.7	59.8	51.2	41.4	37.1

The hours of sunshine average only 45 percent of the daylight hours except in September, when the percentage drops to 34. The long periods of cloudy weather and the high rainfall make it difficult to harvest grain during this month.

Figure 4 - Day-degrees above 50° F for 10-day periods during the growing season, averages for 1950-61.



## RAINFALL

Rainfall during the summer is abundant and evenly distributed (Table 1). The monthly average is about three inches, but it varies widely from year to year. There is practically always adequate moisture for crops, especially as evaporation is low except in June and July. Excess rainfall often hinders field work, especially on poorly drained land.

### Amount

The three stations have much the same pattern of rainfall during the growing season (Figure 5). The rainfall is lowest in May, and this helps appreciably in getting the spring field work under way. It is highest during the last 10 days of June and then decreases markedly until about the end of July. From then to the end of September it increases gradually except mainly for a marked increase at Ville-Marie in the first ten days of August.

### Periods without Rain

Table 3 shows the average numbers of days in runs of at least three, six, and ten days without rain at the three stations from 1950 to 1961. From June to September, Kapuskasing had an average of six or more consecutive dry days only in August; Amos, only in June and August; and Ville-Marie, in June, July, and August. None of the stations had an average of 10 consecutive dry days in the growing season.

Table 3 – Average Numbers of Days in Runs of at Least 3, 6, and 10 Days without Rain in the Growing Season, 1950 to 1961

Station	May	June	July	August	September
<i>3 days</i>					
Kapuskasing	14	9	10	15	9
Amos	18	11	14	13	8
Ville-Marie	18	14	16	17	12
<i>6 days</i>					
Kapuskasing	6	3	4	8	3
Amos	10	6	5	7	3
Ville-Marie	11	8	7	9	5
<i>10 days</i>					
Kapuskasing	3	0	2	3	1
Amos	6	0	2	1	1
Ville-Marie	4	1	2	2	0

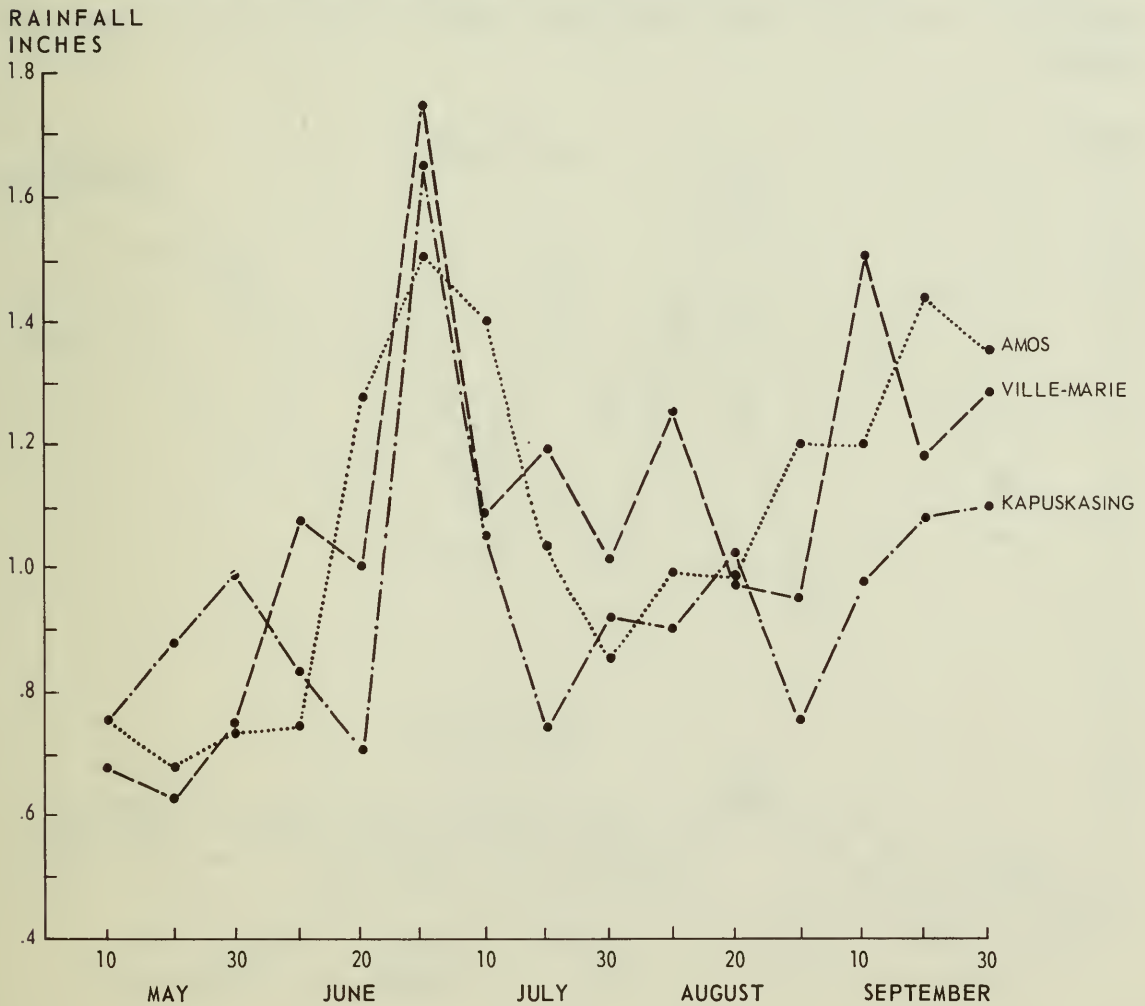


In June and July periods of three consecutive days of dry weather are sufficient to conduct haying and ensiling operations, at least on land that is fairly well drained. In late August and September, periods of four to six dry days are needed for grain to dry enough for harvesting. Besides greater rainfall then and the lower evaporation, dew usually persists until nearly noon.

### Days of Rain

With a cool, temperate climate as in the Clay Belt, the frequency of rains is highly important. When they are frequent and the evaporation low, most of the heavy clay soils remain wet because of their poor natural drainage.

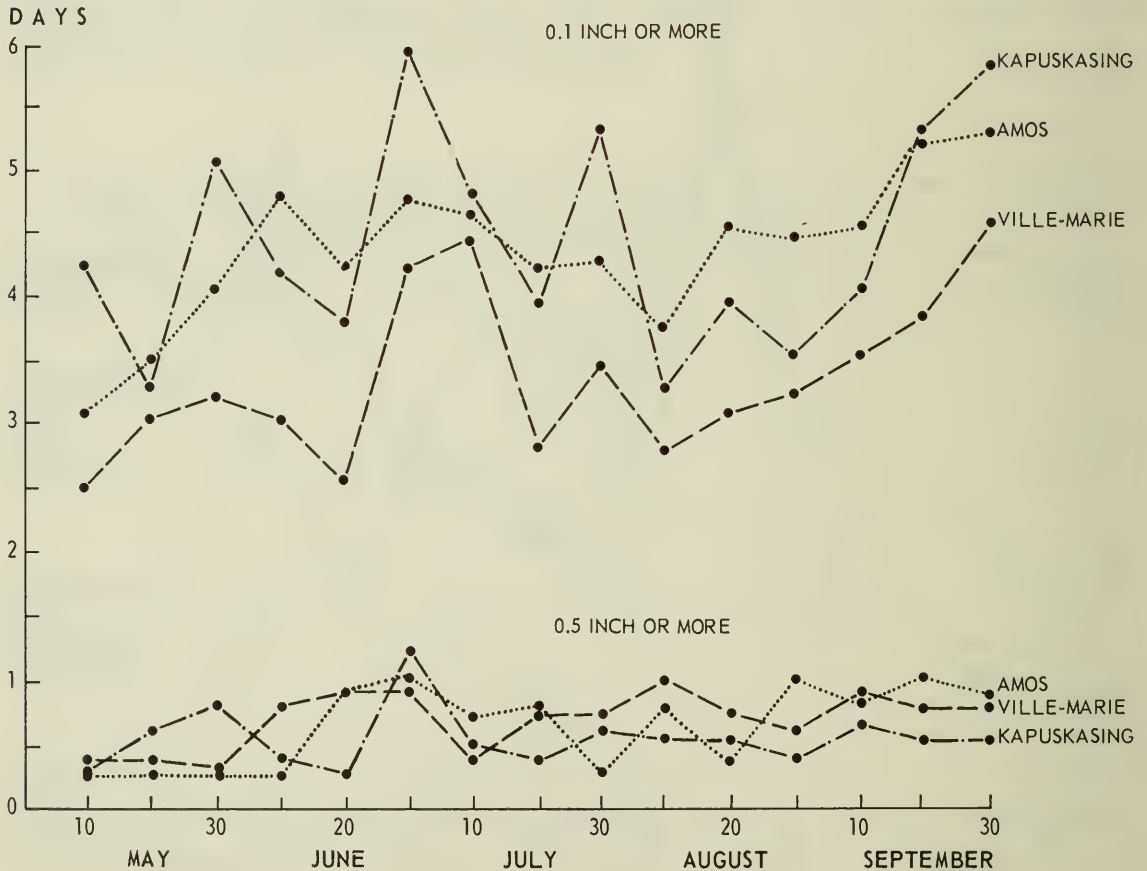
Figure 5 — Precipitation for 10-day periods during the growing season, averages for 1950-61.



There is some rain on an average of more than one day in three during the growing season (Table 1). On many of these days there are only light showers. At Kapuskasing the percentage of rainy days with less than a tenth of an inch ranges from 37 to 49, and at Amos from 31 to 39, according to the month. The percentage is noticeably lower at Ville-Marie than at Kapuskasing or Amos. In June and July, these light rains, at least when they occur at appreciable intervals, hardly hold up the field work, such as haying, because the evaporation rate is high. But in August and still more so in September, even these light rains keep the soil wet for long spells and hold up farm operations, especially as rains of half an inch or more are frequent then.

The number of days of rain does not vary greatly from month to month during the growing season (Figure 6). The times when days with at least a tenth of an inch of rain are most frequent are: the end of June or early

Figure 6 - Numbers of days out of ten during the growing season with rainfall of a tenth of an inch or more and of half an inch or more, averages for 1950-61.



July, the end of July, and late September. In August and much of September the number of rainy days is highest at Amos.

The number of days of heavy rainfall (half an inch or more) varies only slightly during the season and is highest at the end of June. Kapuskasing has, in general, fewer days of heavy rain than the other stations.

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